San Fernando Valley State College

HEALTH REASONS FOR THE ESTABLISHMENT OF MINIMUM ROOM SIZE STANDARDS

A thesis submitted in partial satisfaction of the requirements for the degree of Master of Science in
Health Science
by
Thomas W. Barnett

June 1972
The thesis of Thomas W. Barnett is approved:

Committee Chairman

San Fernando Valley State College

May, 1972
Dedicated

to

Patricia

and

Two Very Special Daughters

Eileen and Sheila
ACKNOWLEDGEMENTS

I am grateful to my wife, Patricia, for the many subtle ways in which she guided me in this study.

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ABSTRACT

HEALTH REASONS
FOR THE ESTABLISHMENT OF
MINIMUM ROOM SIZE STANDARDS

by

Thomas W. Barnett
Master of Science in
Health Science
June, 1972

This study was an inquiry into the history of housing codes in search of the health reasons which led to the establishment of minimum room size and occupancy standards. The relationship between ventilation and space standards and the relevance of existing standards were also considered.

It was found that the early housing standards were borne out of a rising social concern about the increased disease and death associated with the living conditions of the poor. The early space, occupancy and ventilation standards preceded the development of the germ theory. The germ theory apparently validated the early beliefs that respired air contained some harmful
The impact of modern medicine and improved sanitary measures have caused some housing experts to question the continued use of the early health rationale as a basis for the enforcement of some occupancy standards. The behavior of occupants rather than the number of occupants might be a more significant factor in the transmission of disease. The functional use of space and the influence of a variety of subjective factors were found to be of more concern to some housing investigators.

Housing officials might also be influenced by subjective factors such as their own cultural, social and economic backgrounds. This may account for the opinion, by some experts, that housing standards tend to reflect a middle class response to the low income families' needs.

The author accepted the use of space standards for construction but rejected the use of fixed standards for occupancy. He promoted the concept that the social health and welfare of occupants should be the prime factor in establishing occupancy limits.
Chapter I

INTRODUCTION AND BACKGROUND OF THE PROBLEM

In the last thirty years there has been an increased awareness of the social and health problems associated with bad housing. Many government programs designed to improve poor living conditions have been proposed and in some cases implemented. These programs invariably start by defining what conditions will be considered substandard. Usually the criteria used for making such definitions involve items related to deterioration, dilapidation, the lack of certain features such as plumbing, or the presence of some hazardous feature such as unsafe wiring.

One measure of an inadequate or substandard building is when rooms do not meet certain required minimum room and space dimensions. For example, bedrooms in private single family dwellings may be required to have at least ninety square feet and be not less than seven feet wide. If the room is to be occupied by more than two people, the minimum floor space requirement is increased to one hundred and forty square feet (61). Some health codes also contain certain volumetric requirements. For instance, if there are two occupants, a sleeping room must contain six hundred and thirty cubic
feet of air space. For three people the minimum requirement is increased to eleven hundred and thirty cubic feet of air space (36).

Most room and space requirements utilized today have been in existence for many years. The reasons for establishing these minimum standards seem to be vague. Practitioners in the field of housing enforce these standards, yet have little or no understanding as to why they exist.

Statement of the Problem

The objective of this study was to determine the health reasons for the establishment of minimum room size standards. The relationship between ventilation and space standards was also considered.

Importance of the Study

The rationale for establishing room size and space standards has been to promote healthful living by preventing overcrowding in dwelling units. However, standards may become obsolete and they should be reviewed periodically to see if they are still appropriate (28).

This study was concerned with how standards in general were established and the historical development of room size standards. In addition some consideration was given to current attitudes about the relevance of
room size standards in use today. Ultimately, this information can be utilized by members of the Los Angeles County Health Department when reviewing existing standards or developing new ones.

Limitations of the Study

This study was limited to a review of existing and available literature on housing as well as interviews with experts in the field of housing. A review of other literature might lead to different observations and conclusions. No attempt was made to distinguish between the sleeping room size requirements of hotels, apartment houses or dwellings. The room size standards of institutions such as mental facilities, hospitals, jails and boarding homes were not considered.

Definitions of Significant Terms Used in This Study

Building Code: those laws which deal with the construction or conversion of a structure; the correct assemblage of proper materials to promote fire safety and to produce a sound building.

Ceiling Height: the vertical distance from the finished floor to the finished ceiling.
<table>
<thead>
<tr>
<th><strong>Code:</strong></th>
<th>a body of laws of a nation, state, county or city, arranged systematically for easy reference.</th>
</tr>
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<tbody>
<tr>
<td><strong>Cubic Air Space:</strong></td>
<td>see room volume</td>
</tr>
<tr>
<td><strong>Floor Area:</strong></td>
<td>see superficial floor area</td>
</tr>
<tr>
<td><strong>Floor Space:</strong></td>
<td>see superficial floor area</td>
</tr>
<tr>
<td><strong>Habitable Room:</strong></td>
<td>a room which meets the requirements for sleeping or living purposes, excluding such enclosed places as closets, toilet rooms, hallways, cellars, attics and similar spaces.</td>
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<tr>
<td><strong>Housing Code:</strong></td>
<td>the laws which deal with how people live in and around a structure, that is, the maintenance, sanitation, ventilation, use and occupancy of living units.</td>
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<td><strong>Minimum Room Size:</strong></td>
<td>the legal minimum floor area permitted by rules or regulations of a governmental body.</td>
</tr>
<tr>
<td><strong>Performance Standard:</strong></td>
<td>the criteria established to achieve a certain goal, such as, an adequate amount of floor area for the proper positioning of a bed, chest of drawers, chair and bedside table.</td>
</tr>
<tr>
<td><strong>Room Volume:</strong></td>
<td>the product of the floor area and average ceiling height.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
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</tr>
<tr>
<td>Room Width</td>
<td>the lesser distance from one finished wall to the other finished wall.</td>
</tr>
<tr>
<td>Sleeping Room</td>
<td>a room which is designed and intended to serve as a bedroom.</td>
</tr>
<tr>
<td>Specification Standard</td>
<td>a detailed enumeration of particular items such as the exact minimum acceptable floor area of a sleeping room.</td>
</tr>
<tr>
<td>Standard</td>
<td>an established rule, a basis of comparison with certain predetermined criteria.</td>
</tr>
<tr>
<td>Substandard</td>
<td>not measuring up to the established rule.</td>
</tr>
<tr>
<td>Superficial Floor Area</td>
<td>the usable floor area within the enclosing walls of the room, excluding built-in equipment such as wardrobes, cabinets and fixtures.</td>
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Chapter II

VARIATIONS IN SPACE REQUIREMENTS

Standards in general are used as guides by administrators in policy making. The policies derived from standards are directed at controlling either individual or group behavior.

There is an assumption that such controls are beneficial to society. This assumption is linked to the social forces that led to the conception of the standards.

When the standards are developed by technical, economic, legal and political experts, they may take on new attributes. Tebbens (58) has pointed out that by setting standards you can permit an otherwise unwanted activity to exist, at least up to the maximum acceptable level. Pollution standards tend to allow pollution and occupancy standards tend to allow crowding, at least up to a certain point.

Standards may be expressed in terms of performance criteria or based on exact specifications. When the quantitative criteria that makes up the standard is used as a policy rule, it is sometimes called an advisory standard. Advisory standards are better in some cases because they are easier to revise as needs change. Advisory standards usually do not have the same legal status as the
standards that are adopted officially and become an integral part of a legal code. Building and housing codes for the most part consist of officially adopted standards.

The space requirements established in building and housing codes vary greatly. Grad and Hack have examined the housing standards of twenty cities and found that the minimum floor area for sleeping rooms ranged from fifty square feet for one person, with thirty additional square feet for each person thereafter, to as much as one hundred square feet for the first person and forty square feet for each additional person. Minimum ceiling heights varied from seven feet to eight feet. Some of the cities required that the minimum width of sleeping rooms be at least seven feet. Their inquiry into seven state-adopted housing codes revealed a range of minimum sleeping room size of from "more than fifty-nine square feet to a minimum of one hundred square feet for one person" (26:24,27).

Beyer also cited an example of a conflict in regulations that existed within the city of Washington in which

... the building code of the city of Washington requires a ceiling height of eight feet for residential buildings; the old Housing Division of the Public Works Administration, in its housing standards, fixed a minimum ceiling height of eight feet six inches; (and) the United States Housing Authority set a minimum height of seven feet ten inches (6).

Senn has compared four of the major building codes
in use today with a federal housing guide and a recently developed model housing ordinance. He found that the requirements for minimum ceiling heights were consistent in the building codes at seven feet.

But, according to Senn, there were some gaps and variations in other areas.

This study of codes indicates that two of the four codes require habitable rooms to contain at least seventy square feet and the other two specify ninety square feet minimum. All specify a minimum room width of seven feet (50:11).

None of the building codes specifically establishes a minimum area for living or dining rooms, or requires such rooms. The Uniform Building Code provides that each dwelling shall have one room of at least one hundred and twenty square feet. The size of sleeping rooms must be increased by fifty square feet for each occupant over two. . . . (50:11).

The American Public Health Association—Public Health Service Recommended Housing, Maintenance and Occupancy Ordinance (2:11), hereafter designated as APHA-PHS, has required seventy square feet for the first occupant plus fifty square feet for each additional occupant in a sleeping room. In addition, four square feet of closet space were to be provided for each occupant or the sleeping room requirement is increased by the deficiency. This appeared to be a minimal standard at first glance, but the ordinance also required a one hundred and fifty square foot minimum total floor space in the dwelling for
each occupant. This is increased one hundred square feet for each additional occupant, thus making this code's standard more generous in space requirements and inconsistent with several of the major building codes.

Performance standards on room size are recently proposed for use in a new federal guide. Senn (50:20) examined a Review Draft of the Housing and Urban Development Guide and felt that the federal practice of basing room size on furnishability had merit. He pointed out that the concept was also being recommended by several European housing officials. But most of the other countries have continued to use specification standards.

The room size standards of a few selected countries were gathered by Karunaratte and Ganewatte (33).

<table>
<thead>
<tr>
<th>Country</th>
<th>Minimum Floor Area of Habitable Room (sq. ft.)</th>
<th>Minimum Height of Habitable Room</th>
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</thead>
<tbody>
<tr>
<td>India</td>
<td>80</td>
<td>9</td>
</tr>
<tr>
<td>New Zealand</td>
<td>150</td>
<td>8</td>
</tr>
<tr>
<td>Philippines</td>
<td>107.6</td>
<td>9.83</td>
</tr>
<tr>
<td>United Kingdom of Great Britain and Northern Ireland</td>
<td>110</td>
<td>8</td>
</tr>
<tr>
<td>Southern Rhodesia</td>
<td>70</td>
<td>9</td>
</tr>
<tr>
<td>Tanganyika</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>Thailand</td>
<td>97</td>
<td>9.83</td>
</tr>
</tbody>
</table>
Havranek (27) also found that the minimum size and height of dwelling rooms in Czechoslovakia did not compare well with the standards of such countries as The German Democratic Republic, Poland, Sweden, Belgium, Netherlands and England.

Senn (50:A3) has summarized the range of recommended minimum room sizes of eight countries, including Sweden, England and the USSR:

- Living Room: 165 - 220 square feet
- Parents Bedroom: 110 - 150 square feet
- Room with Two Beds: 100 - 132 square feet
- Room with One Bed: 66 - 110 square feet

These studies all showed that there is considerable variation in minimum room size standards. These variations were found to exist in local as well as national codes and the diversity also extended to the international sphere. The divergence of standards found in these codes suggested that the codes were all derived independently. The question of how and for what reason remains to be examined.
Chapter III

HOW STANDARDS ARE FORMED

Standards are promulgated by government bodies in the form of legislation. Apparently the legal controls vary from place to place because the need for standards in one area is different from another area. More often the standards are adopted from a basic model.

An examination of one model housing code in use today revealed how the code was produced. The APHA-PHS Ordinance of 1969 was the product of a subcommittee of housing experts co-chaired by F. A. Jacocks and E. W. Mood. The standards, according to Mood, represented no single point of view, but were based on a consensus of opinion. These opinions came from not only the subcommittee members but many persons affiliated with such agencies and organizations as local, state and federal government, professional organizations, trade associations and technical groups. Mood also pointed out that the code was a revision of A Proposed Housing Ordinance prepared in 1952 under the joint leadership of C. E. A. Winslow and Dr. E. R. Krumbiegel.

A Proposed Housing Ordinance was also a product of a group of experts called the "Committee on the Hygiene of Housing, of the American Public Health Association." The
ordinance was designed to be used as a legislative model and "is the foundation of many housing codes that have been used in the United States" (2:7). Many of the requirements found in A Proposed Housing Ordinance were similar to those found in the model codes that were produced as early as 1910. These codes were also developed by expert committees (62).

The Revised New Code of the APHA-PHS has been adopted in New York and Pennsylvania. In time it may become as widely used as its predecessor.

Why was the old code revised? Mood explained that

In the fifteen years since A Proposed Housing Ordinance was first published, the science and art of the control of housing through administrative law have developed to the point where the original document is in need of revision (2:4). The enforcement procedures needed updating. Apparently there was little or no reason to change many of the standards, except that the consensus of opinion on housing standards had changed.

Grad and Hack have delved into the modification of standards in general and have suggested that changes in standards are usually born out of a rising level of public expectations.

Sometimes a change in standards is applied retroactively to existing conditions. When such a change
involves the occupancy or size of a room then the owner or tenants may feel that the new standard is being unfairly enforced. Grad and Hack pointed out that being "caught retroactively" by standards has been upheld by most courts.

There is no real legal obstacle to changing—and raising—minimum standards for housing, including standards of occupancy designed to avoid overcrowding. Courts, on the whole, will accept the legislative and administrative judgement on what the minimum standards should be, as long as the proposed minimum standards do not exceed the normal expectations and experience of the times (26:42).

To assess what are "the normal expectations and experience of the times" seems simple but in reality may involve the use of every tool that a housing reformer can muster.

First of all, there is the need to get data and opinions from all of the experts of many different specialties. In the APHA-PHS Ordinance (2:1-8) the consulting experts included city planners, architects, social and behavioral scientists, lawyers, economists, welfare workers, housing officials, health and fire department administrators and safety specialists.

Secondly, there are many federal programs that make use of housing standards. These programs usually require a certain measure of citizen participation. This means that there is a need to develop ways to reach those who feel the greatest impact of the new standards.
The use of citizen advisory groups has been very successful in the past in the establishment of many standards (51), (41). The advisory groups are usually composed of involved and knowledgeable people. For example, leaders from business groups or the industry to be regulated are often well represented. But a citizens group on housing standards would now be considered incomplete unless it included representation from not only the owners of structures but the occupants as well.

Getting an occupants group together may present some difficulties for the housing reformer. The low income life style of the occupants so often leaves little time or energy for anything other than the immediate day to day needs (19). The best means of solving this problem is currently being examined, but is beyond the scope of this thesis (18).
Chapter IV

A BRIEF HISTORY OF CODES

OVERCROWDING AND ROOM SIZE STANDARDS

The use of advisory and expert committees to exchange opinions on criteria probably goes back to the beginning of civilization. It seems likely that early man forced some of his attitudes on other members of his community. Perhaps a simple preference such as the placement of bodily waste might have led to early agreements on how to live. Possibly other common annoyances created understandings which, when violated, provoked group action against the violator.

The earliest known construction work consisted of huts put up by hunters who visited the shore of the Mediterranean some 300,000 years ago (12). The shapes of the floor pattern show that there was uniformity in construction. Does the uniform construction represent an early building standard? Such behavior during the prehistoric days is open to conjecture.

One of the earliest recorded building regulations appeared about 4000 years ago. The Code of Hammurabi provided that if faulty construction caused a death of a householder, then the builder would be put to death. If the construction caused the death of the householder's
son, then the son of the builder would be put to death and in a similar manner it went on to cover the death of slaves, and the rebuilding of any property destroyed by the collapse of the structure (14).

Johnson (32) cited historical studies that showed that housing legislation existed in China at about 1000 B.C. and that during the days of the Roman Empire, the Roman Code of the Twelve Tables established minimum standards in regard to fire safety, structure and sanitation.

Hobson (29) stated that the book of Deuteronomy showed that Moses realized the importance of rules for a healthy way of life. These rules included an early admonition regarding the need of parapets on rooftops to prevent sleeping people from falling.

When thou buildest a new house, then thou shalt make a battlement for thy roof, that thou bring not blood upon thine house, if any man fall from thence (59).

Another early recorded regulation appeared when the Lord Mayor of London, in 1189 A.D., issued a decree, The Assize of Buildings, which required the use of stone party walls, cesspools and other basic health needs (33).

Overcrowding was noted as the cause of sanitary difficulties in London as early as the sixteenth century.

Mumford stated that:

For about fifty years, from 1582 to 1632, there were frequent references to those evils and half-hearted attempts to correct them (40:122-23).
The Lords of the Council in 1583 found that overcrowded buildings had greatly increased the danger of pestilence and riot. Attention was drawn to the congestion that resulted from dividing up single houses meant to house a single family: a practice that was to become almost universal in every growing town during the next three centuries (40:122-23).

The transformation of single family dwellings to tenements eventually led to official interest in the problem. In 1593 the Elizabethan Act against overcrowding of London houses was proclaimed (20:12). But Mumford explained that even though Parliament attempted to control overcrowding by various proclamations and edicts "... the poultices soothed the doctor's conscience; they could not cure the patient's ache" (40:122-23). He believed that upper class greed and lower class necessity tended to follow their own courses. This was because there was insufficient housing to accommodate an increasing population.

Freedman (20:12) felt that the modern public health movement was nourished by struggles of this type and he credited John Howard's prison reforms of 1774, and Edwin Chadwick's classic survey of 1842 on the Sanitary Conditions of the Labouring Population in England as housing milestones.

Bauer (5) pointed out that this was a period when the "laissez-faire" doctrine prevailed to justify the misery of the people as a curb to over-population. Her
chronology of housing law included an increased concern for the rights of the poor. This so-called "humanitarian" movement resulted in the establishment of the **English Poor Laws**. She stated that the early social action which lead to the formation of standards was not based on any scientific proof for the rules. The scientific facts came only after the great discoveries of Pasteur in 1870. It was social conviction, in her view, that established the principle that some minimum care had to be provided for the sick. This concept, once accepted, eventually led to other laws, such as the **English Public Health Act** of 1848 and the first piece of national housing legislation in England, in 1851. She also cited Chadwick as the man who almost singlehandedly fathered health and housing reforms. She pointed out that Chadwick's published study was significant because it "sold 10,000 copies and started a wave of legislation all over the civilized world" (5).

Hole shared a similar view and explained how the population expansion of the mid-nineteenth century, during the industrial revolution in England, and the attendant overcrowding of structures, led to poor sanitation. She suggested that the excessive mortality stimulated interest in the causes of poverty and eventually this led to the development of housing standards. In her view, the first standards for dwellings
were not embodied in any statute; but by the erection of 'model' dwellings, the housing reformers offered examples of their principles which it was hoped the private builder would copy (30).

She also explained that the high costs involved in providing the better houses kept them out of the reach of all but highly skilled workers.

Many historians concurred that the awareness of the bad conditions became so widespread that the changes were inevitable.

Hobson (29) gave credit to John Howard for first stirring public conscience, and suggested that the turning point really came in 1832, the year of the great cholera epidemic. The occurrence and magnitude of this disease led to a public awakening and stimulated Chadwick's interest in the inhabitants of large towns. He stated that Chadwick encountered much hostility due to his intransigent personality and many of the reforms did not come until Sir John Simon pushed them along with what was described as "skill, eloquence and a more tactful approach."

The philosophy of the nineteenth century has been described by some historians as Darwinian, and this accounted for the prevalence of overcrowded and unfit conditions. Mumford has told of deserted houses of uncertain title that were used as lodging houses with as many as fifteen or twenty people in a single room.
In Manchester, according to police statistics of 1841, there were some 109 lodging houses where people of both sexes slept indiscriminately; and there were 91 mendicant lodging houses (40:166). The report reflected the conditions under which the transients and beggars lived. The families of workers did not do much better. Sigerist referred to an early study related to their plight:

Frederick Engels, in his survey of the conditions of the working class in England, first published in 1845, found that in the working class parishes of St. Johns and St. Margarets, 5366 families of 26,830 individuals lived in London in 5294 rooms and in Little Ireland, a district of Manchester, there was one toilet for every 120 inhabitants (54).

Overcrowding, again, appeared to be the basic underlying cause of many sanitary problems and this inspired Chadwick to agitate for licensing of public lodging houses. He felt that by doing so such matters as cleanliness, ventilation and "numbers proportioned to the space" could be controlled (45:148). Regarding dwellings, he noted the stench found in poor housing and delved into the reasons:

... the cubic space in the better class houses is usually four times greater, occupied partially instead of constantly, whilst the lower class houses are occupied night as well as day, by double the number of persons (45:181).

He advocated that washable walls be required and felt that a more sanitary dwelling could be constructed. He stressed that houses should be "miasma proof" and also be free of "fever producing air" when occupied. In order
to do this he proposed a sanitary specification for ventilation which stated in part:

... that the construction shall be such as to change the air of each living and sitting-room completely, not less frequently than three times an hour ... (45:185).

The history of England included many health and housing firsts but the conditions that led to such action were not confined to England.

By the end of the seventeenth century the people of Manhattan Island had developed housing control measures, such as right of entry and the power to inspect (33). These tools have greatly influenced subsequent housing programs.

One of the precursors to modern housing legislation occurred in the second half of the eighteenth century. New York City enacted regulations in 1761 and 1775 which provided for improvements on existing buildings (33). Housing conditions also received recognition in 1797 as one of the authorized duties of newly appointed health commissioners (33).

The first official reference to increased death rates occurring in areas of poor housing came in 1834 from a New York City health inspector, Gerritt Forbes (33).

The Office of City Inspector of New York was not a very productive position at this time. But one City
Inspector, Dr. John H. Griscom, gained considerable insight into the health problems of the city and issued a full report in 1845 that described the sanitary conditions of the city. He also gave in-depth recommendations on corrections and frequently quoted Chadwick's position, that good public health is a sound investment (46).

His "Remarks" were directed at avoidable causes of sickness and mortality, and ranked crowded and poorly ventilated housing as first among his concerns. His work led to the formation of a group called "The Association for Improving the Condition of the Poor." This group and others conducted surveys which eventually influenced the passage of the first tenement housing law of New York State in 1867 (33).

Another public health agitator of this period, Lemuel Shattuck, also derived much of his inspiration from Chadwick in England (60). In 1850, the Report of the Sanitary Commission of Massachusetts, of which Shattuck was secretary, included recommendations on the control of "sanitary evils arising from over-crowded lodging houses and cellar dwellings" (39:7).

The Massachusetts tenement house law of 1868 may have eventually developed from this commission's early recommendations.

The New York law of the previous year covered similar evils in tenements, which were defined as
buildings where three or more families were living. Friedman (22:26) believed that this law may be the ancestor of all succeeding tenement and housing codes. He implied that the evolutionary root is confused by the existence of state statutory codes and municipal ordinances that have housing code-like sections, but appeared in the form of building codes, plumbing codes and the like.

The New York law included many of the concepts found in modern day codes, such as repairs, ventilation, occupancy and sanitation. But the act was full of loopholes and was not well enforced. The conditions of overcrowding in rooms got worse as New York City became more crowded.

Public awareness of the problem was enhanced by the press and various investigating groups. The New York Tenement House Committee of 1894 found deplorable conditions involving every type of sanitary sin including tiny dark rooms full of people suffering from hunger and disease (22:30).

Most of the publicity was promoted by an ardent housing reformer, Lawrence Veiller. Veiller was secretary of the New York Tenement House Commission which published a report entitled Housing Conditions and Tenement Laws in Leading American Cities (39:8). This report was a critique of the housing conditions and codes in
twenty-seven cities of the United States, and resulted in the enactment of the New York (State) Tenement House Act of 1901.

The New York Tenement House Act was a state measure but it applied to cities like New York City and is generally acknowledged to be the most sophisticated and imitated housing law ever conceived. It contained over one hundred sections and made a distinction between what was to be tolerated as existing, and what would be required of converted or newly constructed tenements.

Although the law dealt mainly with the physical condition of tenements, the social needs such as light, air and space were also spelled out. Regarding space:

No room in any tenement house shall be so overcrowded that there shall be afforded less than four hundred cubic feet of air to each adult, and two hundred cubic feet of air to each child under twelve years of age (22:34).

For Veiller, this law was just the beginning. He continued to develop other legislative housing "firsts." A Model Tenement House Law was produced in 1910 and this was followed by a Model Housing Law in 1914, which applied to all dwellings, not just tenement houses. This 1914 law may have been inspired by a law with a similar feature enacted in Columbus, Ohio, in 1911 (39:8).

Of particular concern to Veiller was the matter of empirically determined room size standards. He felt that cubic air space requirements were of questionable
value because of variations in the kind of air being supplied to the room and its rate of dilution. This led to a revised section on overcrowding in both the Model Tenement House Law and the Model Housing Law. The cubic air requirements were increased to six hundred cubic feet of air to each adult and four hundred cubic feet of air to each child under the age of twelve years. Veiller tempered this change with an admonition to the health officer, that air space is of minor importance if the quality of air and ventilation are not acceptable. He implied that situational judgement should prevail because these matters vary greatly in individual rooms (39:13).

Mood pointed out that Veiller's philosophy on overcrowding and other matters was and is being disregarded. Numerous housing codes today lack the flexibility and comprehensiveness that was proposed by Veiller (39:13). This is true in spite of the fact that many of the cities, counties and states helped themselves to both the concepts and language found in the early New York law or in Veiller's Model Codes.

Overcrowding laws are still expressed in terms of cubic air space in many areas, including California. The California state law dates back to a 1905 penal code which required a minimum of five hundred cubic feet of air space per person in apartments or lodging houses (24). This was increased to 630 cubic feet of air space
for rooms constructed after August 17, 1923 (57). However, by August 1963, air space criteria gave way to superficial floor area as an occupancy limit (8).

The current minimum room size requirement for a sleeping room is ninety square feet of superficial floor area. If the room is to be occupied by more than two people, the minimum floor space requirement is increased to one hundred and forty square feet (61).

The Los Angeles County Public Health Code still cites cubic air space as criteria in limiting occupancy (36).

The whole question of room size, cubic air space and ventilation is at this time being re-examined by experts in housing.
Chapter V

VENTILATION AND SPACE STANDARDS

Historically, room size and occupancy standards appeared to be linked to ventilation requirements in two ways. First, there was the notion that there were certain unknown substances in respired air that were harmful. And second, there were unpleasant odors associated with overcrowding. The harmful feature of respired air was apparently related to the spread of disease. For instance, Chadwick in England noted that along with overcrowding there was that "fever producing air." This led him to propose a regulation to provide for an air change of at least three times an hour (45:185). At about the same time, in this country, there were similar concerns expressed. Griscom of New York assailed the custom of holding school in basement rooms, blaming much of the sickness and death among children on the fact that they were crowded together for many hours a day in small unventilated rooms (16).

There was no real proof of the harmful substances in respired air. But it was determined that one way to find out if these substances were present was to measure the level of carbonic acid in the air (63). Even though carbonic acid was intended to be used only as an indicator, it somehow became the specter. In 1881, Pettenkofer
proposed that 0.07 - 0.1 percent be regarded as a maximum permissible limit \(25:41\). The evidence to prove that air could be contaminated by bacteria from the sick came much later.

One of the early experiments to measure the contamination in air was done by Huddleson and Hall in 1920 \(31\). They reported that during the height of an epidemic of bad colds and coughs, a measurement of the air in an amusement hall contained an average of eighty-two colonies per plate after a one minute exposure of agar plates. The types of bacteria included \textit{Streptococcus hemolyticus} and pneumonia organisms. Eight days after the epidemic subsided, on a retest, they found an average of sixteen colonies per plate under the same conditions except that it was necessary to extend the plate exposure time to ten minutes.

In a later experiment, Challinor \(10\) attempted to analyze the air of sleeping quarters with reduced ventilation and found that there were surprisingly few organisms in the air of rooms that were overcrowded with apparently well people. Only when the room was occupied by hospital patients did the expected numbers and types of organisms appear.

The relationship between overcrowding and increased disease transmission appeared to be well established. Britten \(7\) analyzed the \textit{National Health
Survey made in 1935 and 1936, and found a strong association of common communicable diseases of childhood with overcrowding. There were also many war-time epidemiological studies that pointed to overcrowding as a factor and implied that the reduced air space and presumably inadequate ventilation could result in a higher number of cases of respiratory infection.

For example, Startwell and Smith compared various army posts regarding the incidence of upper respiratory disease and meningitis, and found the same factors appeared to play an important role, "... namely overcrowding and the reception of large numbers of new troops" (56).

In Halifax there was a simultaneous outbreak of diptheria, scarlet fever, meningococcus meningitis, influenza and measles.

Wheller and Morton explained that,

The common factors underlying this general increase in the prevalence of respiratory disease were in large part the result of the impact of the war on civilian life. Crowding and rapid overturn of susceptibles in a population are well recognized as proper fuel for the flame of contagion (64).

Regarding a severe epidemic of meningococcus meningitis in Chili, Pizzi (42) revealed that a survey of the slum section of Santiago showed an index of seven persons per room and an index of 2.9 persons per bed. He felt that the overcrowding and the apparent lack of
immunity against the disease were significant factors in the severity of the outbreak. The early observation of increased disease transmission with overcrowding appears to be borne out by these and other similar reports.

But the early suspected effects of small amounts of carbon dioxide buildup (or carbonic acid level) in a sleeping room are now being re-examined. Goromosov (25:44) stated that inhalation studies revealed that respiration, circulation and cerebral electrical activity were affected by concentrations of carbon dioxide of 0.1 percent. He recommended that average concentrations should be less than 0.05 percent. This could mean (depending on occupancy and room size standards) that more than three air changes per hour are needed to reduce the exhaled carbon dioxide of the inhabitants.

The earlier empirical work of Chadwick and Pettenkofer appears to still have some value. This helps to explain why some of the current requirements for ventilation are still based on Pettenkofer's early beliefs (17).

For a time the use of carbonic acid level as a standard for the establishment of minimum requirements fell into disfavor. Freedman noted that the carbonic acid standard as understood in 1895 was based on illogical criteria and he emphasized the removal of odors. He stated:
air supply should be changed in rooms at a rate of about six times per hour. ten cubic feet of fresh outside air per minute per person will keep odors out (20:905-06).

Freedman's recommendation apparently goes back to the works of Yaglov in 1936. Yaglov, according to Longley (35:3), differentiated between types of occupants, air space per person and the needed outdoor air supply per person to remove objectional body odor. As an example, for two hundred cubic feet of air space for each sedentary adult, of average socioeconomic status, he called for sixteen cubic feet of outdoor air (presumably fresh air) per minute per person. For laborers with the same air space, the air supply was increased to twenty-three cubic feet per minute per person. Longley explained that the formation of this standard was not clear; the goal, removal of objectional body odors, did replace carbonic acid as criterion.

Room odor may be caused by a variety of things such as cooking, heating and various canned aerosol products. Goromosov (25:44) noted that the physiological reaction to odors may include nausea, headache and depression of respiration. He felt that odors can influence a person's emotional state and induce changes in the skin temperature, blood pressure and the activity of the internal organs.

Pogrund (44) stated that odor usually serves as
a detector to a dangerous or unpleasant situation. He pointed out that human odor depends on various factors, such as race and sex; and that intestinal flatus, apocrine sweat and sebum, when undergoing bacterial decomposition can reach an intolerable level. Pogrund has described a variety of space cabin simulator odor studies that reinforce the earlier beliefs about odors and the need for ventilation, but these studies are not extrapolatable to the odor removal problem in a typical urban dwelling.

New data suggests that many of the old assumptions about air change in sleeping rooms are no longer valid.

It was originally thought that the air in a dwelling was renewed once or twice every hour through the interstices of the doors and windows and at the junctures of building materials. This renewal of air, called air change, could be attained by the use of windows in warm weather and also as a result of leakage, called infiltration, in cold or windy weather. The quantity of air believed to be needed to reduce odors originally ranged from about 540 cubic feet of air to 1000 cubic feet of air, depending on whether you selected the recommendations of the French, German or American ventilation specialists.

The American Society of Heating and Ventilating
Engineers adopted a 600 cubic feet per hour standard (63). This value was equivalent to 10 cubic feet per minute per person.

Longley (35) has described how the early fresh air requirements for reduction of body odors ranged from 5 to 25 cubic feet per minute per person. He stated that "... in most homes this would amount to less than 0.5 air changes per hour" (35:10). He explained that in older homes this rate was often not achieved. In addition, he stated, there were studies to show that in the newer homes, where attempts to eliminate infiltration have been made, only 0.2 air changes per hour were found. In his own study of infiltration rates, he measured an average infiltration rate of 0.1 air changes per hour. He felt that the figure was common for most newly constructed homes (12).

Longley's data on infiltration rates seemed to confirm the suspicions of many housing specialists. His work also appeared to put to rest an old belief about the relationship between ventilation, odor control and room size.

The old-line cubic air space concept stated that a room volume of at least 400 cubic feet is required to permit adequate infiltration of outside air to dilute the body odors of a reasonably clean person. This notion was re-evaluated as far back as 1946 by the American Public
Health Association Committee on the Hygiene of Housing. The committee apparently accepted 10 cubic feet per minute as adequate to dilute the odor of one person but argued that the infiltration rate should not be based on volume but on the perimeter of window and door openings. This change in opinion had the added effect of discrediting the basis of most of the legal requirements for occupancy. In the words of the committee publication:

On any other grounds than ventilation, floor area is obviously superior as the test of space adequacy, as it is floor space on which one walks and places furniture. By what magic does a 10 x 12 foot room have a capacity (as it does under numerous legal codes) of two persons if the ceiling is nine feet high, but three persons with a ten foot ceiling? (1).

Now that ventilation by infiltration has been shown to be reduced by modern technology and materials, and in some cases practically eliminated by homeowners who prefer a closed, air conditioned environment, there is really no relevance between ventilation, space standards and room size.
Chapter VI

CURRENT ATTITUDES ON SPACE STANDARDS

There is some concern about the relevance of housing standards. Bair (4), an innovator in modular housing, pointed out that some of the controls imposed by standards and codes have lost their public purpose. "Many housing codes and some building codes ignore the arrival of air conditioning, artificial light and ventilation" (4).

Grad and Hack (26:19) also pointed out that some codes became rigidly institutionalized. Their chronology of the occupancy and room size standards and a comparison of the New York Tenement House Act of 1901 with the APHA-PhS Ordinance showed a gain of thirty square feet in space and a two foot reduction in ceiling height. They did not consider this "... an overwhelming amount of progress in sixty nine years" (26:19).

Mittelbach (37) challenged the premise that enforcement of minimum standards would directly produce major health benefits, especially for the poor. He believed that code enforcement simply reduced the housing supply and substantially raised housing costs. This he contended is not likely to make a significant contribution to good physical and mental health.
He described the "danger" of the slums in terms of economic blight and social disorder rather than breeding grounds of disease (38).

Wilner and Baer have also questioned the continued use of the germ theory as bases for public intervention.

In connection with the role of crowding and disease we must consider the vast advances in this country in the control of communicable disease through sanitary procedures insuring good water supply, sanitary preparation of food and milk, sanitary procedures for disposal of wastes and advances in various dimensions of preventative and curative medicine.

In western nations these issues have surely reduced whatever role the dwelling unit once had in the spread of infection (65:39).

The significance of behavior in disease transmission rather than overcrowding, was brought out by de Groot.

Since the human being persists in maintaining such close contacts through interaction in behavior sets described as kissing, hugging, talking, sleeping, playing, etc., the expanding of space around behavioral activities and sets logically can have but little effect as such and in itself (11).

The social aspects of overcrowding have recently been re-examined. Some investigators have felt that the lack of space and privacy results in "discomfort, displeasure, disappointment and dissatisfaction" (43:10). Others have pointed to increased social stresses and a higher death rate when a family spends a disproportionate share of their income on better housing instead of
This points out another area of concern about housing standards. Solow stated that:

In practice, standards applicable to housing of low-income families have been greatly influenced by the middle class values held by the professionals and public officials responsible for the setting of the standards (55). He suggested that the low-income families' needs are traded away for what society feels is socially desirable, economically feasible and politically acceptable at any given time.

Friedman (22:159) has also described how stable, low-income neighborhoods are destroyed on the basis of criteria which, if ever equally applied, would also involve the destruction of middle class "quaint fashionable and expensive neighborhoods" as well.

There are no easy answers to the various problems of codifying and enforcing housing standards. In general, the more flexible performance and advisory standards appear to be needed and the literature reflects a trend in this direction. However, Shiffman's (52) recent study of the attitudes of administrators revealed a marked preference for the officially adopted standards. His findings seemed to suggest that some administrators feel more comfortable with the "so-called" facts that fixed legal standards represent.
Legally, there is a need for some objective standard. Ascher explained that:

Only by developing objective scientific criteria to measure whether a dwelling is substandard have we provided any basis for raising the place of the health officer above that of another purveyor of opinions (3).

There is also the realization that if all standards are eliminated it would no doubt lead to exploitation by irresponsible builders or landlords and the eventual increase in the prevalence of poor housing.

There has been considerable interest in reducing the amount of bad housing by reducing the cost of home construction. This has stimulated the U. S. Department of Housing and Urban Development (HUD) to review many building and housing codes to determine if changes in the local codes to meet regional standards would result in savings for the home buyer, especially the low income home buyer. While most of the effort is directed at requiring performance standards for materials, there is also some attempt to promote use of performance standards on such things as unit design. For instance, a Review Draft of the Housing and Urban Development Guide (13) contained considerable detail about the function and furnishings of rooms but there was no mention of a specific minimum room size requirement. The room size or space requirements appear to be determined by anticipating such things as the type of use and occupancy, the
size of essential furniture, the needs of circulation space, and the amount and type of built-in furniture and equipment.

The concept of performance standards is not new. The American Public Health Association's 1951 publication *Planning the Home for Occupancy* contained identical concepts that HUD now promotes. What is new is that HUD, in pushing performance standards and uniform codes, will eliminate most of the arbitrary and capricious local codes.

Changes in building and housing codes have always been difficult because there are unwieldy charter provisions or enabling legislation to contend with. There is also a presumption of validity about long established regulations that tend to overshadow any new evidence to justify a change. The code changes may create local friction, but they are occurring because the cities do not want to lose the millions of dollars in HUD community development funds.

The performance standards used on construction materials seem easy to define. Any material will do. "If a wall is made of paper but tests out as strong and dependable as wood, plaster or particle board, why not use it?" (53).

The performance standard on room size also seems easy to determine. The guides contain various tables
which can be used to compute the needed areas for the furnishings and the circulation space. However, the objective criteria are to be used only in the design and construction of the new unit. As a family grows and activities change the room size and house layout often remain the same, especially in the low income family. This can result in what is called "use crowding."

The issue of "use crowding" or the use of the same space or room for different and non-compatible purposes is now of more concern to not only American housing experts but East German officials as well. Geisler approached this problem by ranking the room functions, such as in a bedroom for children:

Sleeping and resting
Working and studying
Playing
Receiving of friends
Storage of garments, toys, etc. (23).

He felt that demands for simple circulation space around furnishings to determine minimum floor space fail to give adequate connected play area and work space.

The notion of "separate use" has also been elaborated on by Senn and others.

There should be a room or rooms in a living unit occupied by two or more persons as a home, where some occupants may entertain, talk to guests or watch television without intrusion on or by others (49).

The use and need for space within a dwelling appears to be only partly related to objective criteria.
There are many subjective considerations that defy precise measurement. It seems that initially, an individual's activities are related to what Leibman has described as a "personal space concept."

In general, personal space is conceived as an expanding and contracting ring or bubble surrounding the individual, which defines the physical separation he requires in relation to others with respect to specific activities and defined relationships ... it moves with the individual, is highly elastic and rapidly altered, and is not ordinarily linked to permanent physical referents in the environment (34).

Wilner and Baer have linked the matter of personal space to the issue of living space in a space scale of their own:

<table>
<thead>
<tr>
<th>Macro-scale</th>
<th>Urban space</th>
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<tbody>
<tr>
<td></td>
<td>Community space</td>
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<tr>
<td></td>
<td>Neighborhood space</td>
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<tr>
<td>Micro-scale</td>
<td>Dwelling Unit</td>
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<td></td>
<td>Environ space</td>
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<td></td>
<td>Housing space</td>
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<td></td>
<td>Room space</td>
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<tr>
<td></td>
<td>Personal space (61:1).</td>
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</tbody>
</table>

While this scale suggests an increase in complexity with actual space distance there is also the concept of "perceptual distance" and "accessible distance" to consider. As Wilner and Baer explained: "Perceptual and accessible distance are semi-independent of physical distance as measured by objective standards" (65).

An example of perceptual distance may be the
closeness felt by a mother to her children when the placement of windows in the kitchen allows a full view of her children in the play yard. The distance may not be easily transversed (not accessible) because of door or room arrangement but nevertheless the perceptual distance is small. The line-of-sight objective distance could be greater than the perceptual distance and the accessible distance could be even greater than the objective distance.

Wilner and Baer have also cited Hall’s observations that space can be perceived in other ways. Although it varies from culture to culture "some spaces are seen as being sociofugal (pulling people apart) whereas others are perceived as sociopetal (forcing people together)" (65:8). They have pointed out that this helps to explain why the Japanese place their furniture in the center of the room and Europeans often place their furniture around the periphery.

Space may symbolize another form of unpleasant experience. For example, the fear of small spaces, claustrophobia, or of open spaces, agoraphobia, are variable depending on a person’s basic psychological make-up and experiences.

Wilner and Baer have also noted that there is the matter of relative measure to consider. If a family of four moves from a dwelling of 2,500 square feet to one of
1,500 square feet, there is a feeling of relative loss of space despite the fact that 1,500 square feet is adequate by most standards for a family of four. On the other hand, housing code field workers often encounter low income families of many more than four persons, who would gladly "move up" to a house of 1,500 square feet of living space, even if it might be considered inadequate by others.

There is a social class difference in attitudes toward housing space. Rainwater, according to Wilner and Baer (65:23), suggested that slum dwellers are primarily interested in the house as a shelter whereas the traditional working class and modern working class (suburbans) have more elaborate expectations.

The working class, in comparison with the upper middle class, assumes more of a right to use other space outside of his own house. Fried and Gleicher (cited by Wilner and Baer; 65:19) noted that there is less differentiation between "'our space,' 'their space' and 'public space' and so on." Thus the living space of the working class extends well beyond the walls to the street, hallways and apartments of others. The middle class appears to be more concerned about private space; even to the point of desiring physically separated houses.

But regardless of class, as families increase in size, relative overcrowding may often become real spatial
insufficiency and require a move to more spacious housing. Where this is not possible the eventual result is what housing experts call overcrowding, or high density living.

High density living has been said to cause a wide range of social malaise. One could argue that social malaise might cause high density living. This "chicken and the egg" argument is tied to whatever operational definition of social stress, mental health or high density living is selected for a basis for discussion.

Freedman (21:58-61) attempted to isolate the affects of density on human behavior, from all of the physical factors such as high temperature, odor, lack of air, physical discomfort and restriction of movement.

The study, involving the performance of both simple and complex tasks in both crowded and uncrowded rooms, failed to establish any negative effects of high density. However Freedman did report a sex difference in the subjective reactions. Men in small rooms found the experience less pleasant than women.

There are limitations to what inferences can be drawn from this study because task performance is not a complete measure of livability and the subjects, no doubt, had different expectations as test subjects rather than residents in high density areas.

One important conclusion was brought out by the
investigator:

••• suggesting that the number of individuals who must interact, rather than density, is the variable that produces substantial effects on human behavior (21:86).

The effect of interaction has been observed in many crowded cities. One of the best examples of high density housing is in Hong Kong. Samuels reported that in the

• • • Li Cheng UK section of Hong Kong there were over 70,000 refugees in small concrete flats, ten feet by ten feet, each housing from three to seven people.

Toilet and water facilities are minimal in the section, averaging one for each three hundred people (47).

Mitchell delved into the personal, family and social consequences of Hong Kong's high density living. He pointed out that attitudes toward housing, especially toward the amount of space that one has and toward the lack of privacy, are only indirectly related to densities within the dwellings. He suggested that the awareness of a lack of space will not have the same stressful affect on Southeast Asians as it would on a member of some other culture.

There were some factors which tended to create stress even for people in Hong Kong but these factors were not as strongly linked to the usual limiting criteria often associated with poor housing. The numbers of rooms, amenities, absolute amount of area and the
number of individuals within a dwelling unit were less important than the forced interaction with nonrelatives when families are doubled up. As Mitchell stated: "... Large numbers of people in high density housing can be tolerated more easily if these people are all ones kinsmen" (43:93-95).

One investigator, according to Wilner and Baer, stated that a Hong Kong Housing Authority official believed that a doubling of the standard allocation of thirty-five square feet per person would induce the tenants to sublet (65:36).

The people of Hong Kong have apparently adapted to what others would call overcrowded conditions. Mitchell felt that individuals could tolerate very high densities within their own family dwelling unit. He was not so optimistic about the effect of high density housing on the ground density or the street environment.

There appears to be a real need for research on the use of living space; however there are so many differing patterns of the use of space, both qualitatively and quantitatively, that it is hard to know where to begin.

Cappon (9) believes that housing research was hampered by a complexity and inter-dependence of many factors. Some of the factors that may contribute to a person's satisfaction with a certain amount of floor
space include: ownership, circulation, access to other significant environments and duration of occupancy. He also implied that the perception and attitudes about space vary greatly, and pointed out that:

... man can adapt to small spaces like a submarine, or a space capsule, or even a crowded camp in a national park, for a considerable time, without adverse psychological effect (9).

This suggests that apart from duration, the motivation of the mission, and the symbolic significants of the environment play a role.

DuBos pointed out that: "... throughout history man has proved his ability to make adjustments that tend to correct the disturbing effects of the environment" (15).

But he felt that there might be a limit to the benefits produced by adaptive response.

Adaption to crowding may also have unfortunate results in the long run. Admittedly, man is a gregarious animal who commonly seeks crowded environments. But this does not mean that man can indefinitely increase the density of his population; it means only that the safe limits are not known.

In animals, crowding beyond a certain limit results in behavioral and even physiological disturbances. Man has generally avoided the worst of these disturbances through a variety of social and architectural conventions and especially by learning to develop psychological unawareness of his surroundings.

In extremely crowded environments each of us lives, as it were, in a world of his own. But eventually this adaption to crowding decreases man's ability to relate to other human beings.
He may become unaware of their presence and totally antisocial (15).
CHAPTER VII

SUMMARY AND CONCLUSIONS

The early space standards for living units were apparently linked to the observation that the overcrowding of rooms was associated with an increased incidence of disease and death. It was surmised that respired air carried some harmful substances and that more space and increased ventilation would help to reduce the effect of the substances. The scientific evidence that respired air could contain harmful substances came after the development of space, occupancy and ventilation standards.

In general early space standards and other housing code requirements gradually evolved out of an increased awareness of the living conditions of the poor and a rising social conscience.

Many of the present-day housing codes can be traced back to the 1901 New York Tenement House Act. This act required a specific minimum room volume for each occupant. The model housing laws which followed this code also required acceptable ventilation.

The early New York space and ventilation standards gained validity with the development of the germ theory. The suspected harmful effects of carbon dioxide also played a part in the general development of
ventilation standards. However, ventilation standards were eventually to be based principally on the control of body odors.

Room size and cubic air space standards were linked to ventilation and body odor control through a belief that a certain size room would leak enough air to reduce the body odors of a specific number of people. This concept was recently re-examined and found to be faulty because it failed to consider the various activities of the occupants, the changes in building materials and the advances of modern technology.

There is also concern about the relevance of other criteria used in the establishment of building and housing codes. Many of the old standards are still in use and prohibit any innovations in materials or the use of new minimum dimensions which might make the construction of living units less costly.

There is now less consideration given to the notion that overcrowding promotes physical disease, at least in a modern industrialized nation like the United States. Some housing experts now stress the social and economic factors as rationale for better housing. Others feel that because housing codes represent middle-class values they do little to improve the well being of the low income families that receive the full impact of the programs.
In general, most of the housing experts believe that without building and housing standards there would be outright exploitation by irresponsible builders and landlords. This would result in an increased inventory of low quality housing. There is now an attempt to force housing costs down so that some new housing will be within the reach of low income families. The federal government is insisting that cities adopt uniform regional codes as a condition of receiving housing program financing. This should eliminate most of the arbitrary and capricious local codes.

The new uniform codes contain minimum space specification standards that are very similar to the old uniform codes. The standards may have been retained because of the lack of good reasons to change the code. These standards may also reflect the needs of the administrators for accepted objective criteria.

There is now more interest in the social and functional use of floor space. Some of the recent studies on this subject attempt to establish optimum standards rather than minimum standards so that use-crowding can be reduced. These inquiries are of interest because they point out the various factors that impinge upon any effort to establish room size standards. These factors include the hidden influences of such items as access to other use areas, ownership and duration of occupancy.
In general these studies show that people have different perceptions and attitudes about space depending on their cultural, social and economic backgrounds. Even their aspirations may determine how satisfied they are with a certain amount of space.

Housing experts are also influenced by their own backgrounds and aspirations when they make judgements regarding room size and other building code requirements. It is conceivable that if a new room size standard is ever proposed, it will be considered by some experts as idealistic and impractical to enforce. Others will regard the same room size requirement as setting a sub-standard requirement.

One reason for the difference of opinion might be that the proponents of such a new standard might not be aware of the difficulty in enforcing standards. The opponents of such a new standard might recognize the enforcement problems but be unfamiliar with the need to consider social and economic factors.

It could be that the housing expert of the future will have to weigh the uncertain advantages of larger rooms or reduced occupancy against the known disadvantages of increased housing costs for the poor. On the other hand, housing experts could be justified in standing firm with the principle that any failure to elevate room size standards and reduce occupancy would indicate
a lack of interest in improving the quality of housing for the poor. Both cases are tenable because the literature suggests that the needs and social values of the low income families are at times compromised by the values and social conscience of the housing and building experts. The experts, in turn, are influenced by economic factors, political considerations and the expectations of the general public.

All factors considered, it seems plausible that young and prosperous cities would be more inclined to accept an optimum space standard than an old city with more low income inhabitants. Or, as is the usual case, where combinations exist there may be new standards for new construction and old standards for the existing buildings.

Recommendations

The room size standards in the future should not be based directly on the past physical health concepts, but rather on the basic functional needs of the occupants. There is a certain amount of objective criteria available on these needs. The subjective factors could also be considered without adding substantially to the costs of the living units.

The occupancy standards should be based on situational considerations rather than the objective
criteria of cubic air space and floor space. The situational considerations should include all the basic needs of the occupants. For example, consideration should be given to the needs of: an aged person alone on a fixed income, a newly married couple without resources, or a large family experiencing an economic reversal. This recommendation is simply an extension of the attitudes and concerns for the poor that led to the development of the first housing standards. What is needed is the promotion of the concept that social health and welfare, without middle class embellishments, be the prime factor in the establishment of an occupancy performance standard.

The administrative procedures for such a standard would have to include a certain measure of social sensitivity on behalf of the field worker (the inspector) and an acceptance by the administrator of a wide range of field judgements. This may present some difficulty for the administrator who is used to dealing with objective criteria. However, such an approach could conceivably produce more benefits than the blind application of a set occupancy rule. Enforcement of fixed or rigid rules may aggravate an already bad situation.

This concept of field judgement based on situational consideration is, no doubt, being practiced by some field workers who are caught up in the realities
of enforcing occupancy standards in communities that have less and less low income housing. The practice appears to be justified and merits inclusion in policy guidelines.

Housing field workers should be genuinely interested in how people live within a structure and be less concerned about how many people live in the structure.
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